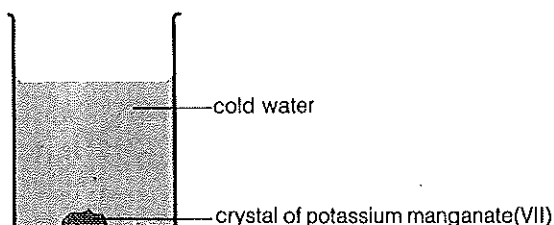
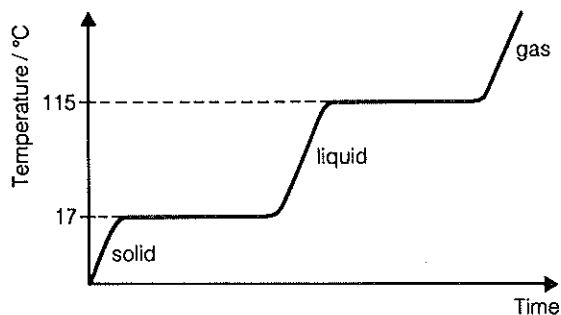


# Questions on Section 1

- 1 A large crystal of potassium manganate(VII) was placed in the bottom of a beaker of cold water and left for several hours.



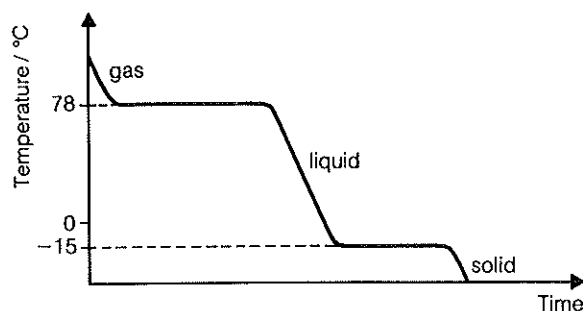
- Describe what would be seen after five minutes.
  - Describe what would be seen after several hours.
  - Explain your answers using the idea of particles.
  - Name the *two* processes which have taken place during the experiment.
- 2 Use the idea of particles to explain why:
- solids have a definite shape;
  - solids cannot be poured;
  - liquids fill the bottom of a container;
  - you can't store gases in open containers;
  - you can't squeeze a sealed plastic syringe that's completely full of water;
  - a balloon expands as you blow into it.
- 3 Draw diagrams to show what happens to the particles when:
- water freezes to ice;
  - steam condenses to water.
- 4 The graph below is a heating curve for a pure substance. It shows how the temperature rises with time, when the solid is heated until it melts, and then the liquid is heated until it boils.



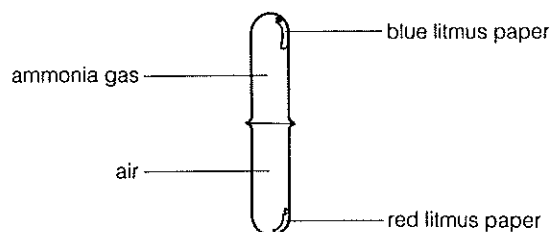
- What is the melting point of the substance?
- What is its boiling point?
- What happens to the temperature while the substance changes state?
- How can you tell that the substance is not water?

- 5 Sketch the heating curve for pure water, between  $-10^{\circ}\text{C}$  and  $110^{\circ}\text{C}$ . Mark in the temperatures at which water changes state, and its state for each sloping part of the graph.

- 6 A cooling curve shows how the temperature of a substance changes with time, as it is cooled from a gas to a solid. Below is the cooling curve for one substance:



- What is the state of the substance at room temperature ( $20^{\circ}\text{C}$ )?
  - Use the list of melting and boiling points on page 9 to identify the substance.
- 7 Using the idea of particles explain why:
- the smell of burnt toast travels all over the house;
  - when two solids are placed on top of each other, they don't mix;
  - a liquid is used in a car's braking system;
  - if you pump up your bike tyres quite hard you get a smooth ride;
  - halving the volume of a gas will double its pressure;
  - pollution from just one factory can affect a large area of land.
- 8 A test-tube of ammonia gas is placed above a test-tube of air. Ammonia is an alkaline gas that turns litmus blue. It is lighter than air.

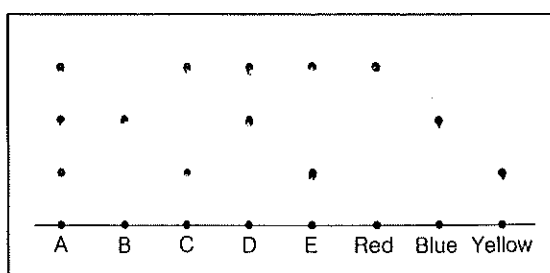


- After a short time the red litmus paper turns blue. Explain why.
- Would it make any difference if you reversed the test-tubes? Explain your answer.
- What would you *see* if the test-tube of air was replaced by one containing hydrogen chloride?

11. A mixture of salt and sugar has to be separated, using the solvent ethanol.
- Which of the two substances is soluble in ethanol?
  - Draw a diagram to show how you would separate the salt.
  - How could you obtain sugar crystals from the sugar solution, *without* losing the ethanol in the process?
  - Draw a diagram of the apparatus for c.

10.

Eight coloured substances were spotted on to a piece of filter paper, which was then stood in a covered glass tank containing a little propanone. Three of the substances were the basic colours red, blue, and yellow. The others were dyes, labelled A, B, C, D, E. The resulting chromatogram is below:



- Which dye contains only one basic colour?
- Which dye contains all three basic colours?
- Which basic colour is most soluble in propanone?